the use of a graphic curve which betrayed the inadequacy of the sphygmograph to follow the finer movements of the artery, yet how many brilliant discoveries have arisen from accidents of manipulation or interpretation! To have discovered the means of controlling one of the most cruel ills to which man is subject is perhaps the laurel wreath amid the many memorials of one who, in his humanity, would have prized this above all rewards.

By academic and official decorations Lauder Brunton was richly distinguished; but perhaps, in his loyal and patriotic heart, the honour of none of these was to be compared with the glory of his younger son, a promising Cambridge medical graduate, who last year gave his life on the field of battle for his country—a glory, but also a sorrow which, falling but a brief five years after Lady Brunton's death, deepened the shadows of his latter days. Happily his elder son, also on military service, and his devoted daughters were still spared to him. C. A.

The death of Sir Lauder Brunton on September 16, in his seventy-third year, has deprived the world of a great physician, and brought sorrow to a wide circle of friends. Largely by his vivifying studies and teaching, pharmacology has become a definite branch of science. Practical medicine depends on physiology, pharmacology, and pathology, and all three tend more and more to become subdivisions of the all-embracing science of chemistry. In no departments of the healing art is the influence of laboratory methods more apparent than in those directed to the study of disorders of digestion and diseases of the circulation; and in both these directions Sir Lauder Brunton was a pioneer worker. He had the clearest conceptions of clinical facts, and possessed to an unusual degree the practical quality of being able to apply extensive knowledge of physiological medicine to the work of the hour. His stimulating personality will be widely missed by his professional brethren as well as by many who have benefited by his work and advice.

Thomas Lauder Brunton was born at Hiltons Hill, Roxburgh, in 1844, and received his medical training at the University of Edinburgh, where he had a distinguished academic career, and graduated M.B., C.M. with honours in 1866, receiving also the gold medal for his thesis. In the following year he became B.Sc., in 1868 he obtained the M.D., and two years later the D.Sc., in the meanwhile having also studied at Paris, Vienna, Berlin, and Leipzig. Settling in London, he became lecturer on materia medica at the Middlesex Hospital in 1870 and assistant physician at St. Bartholomew's Hospital in 1875, to which school he remained attached as lecturer, physician, and consulting physician.

Early in his career Brunton's inclinations leaned towards the scientific side of medicine, and at the early age of thirty he was elected F.R.S. in recognition of his admirable work on the physiology of digestion and secretion, on the chemical composition of the blood, and on the actions of the two drugs, digitalis and mercury.

Brunton's post at St. Bartholomew's carried with it the lectureship on materia medica and therapeutics, and he turned his attention to the effects of medicines and instituted many experimental investigations on the actions of drugs upon himself and upon animals. In 1885 he published his well-known book on "Pharmacology, Materia Medica, and Therapeutics," which passed through many editions in this country and abroad. This appeared at an opportune moment, and largely owing to his work and writings pharmacology became separated from materia medica and established as a branch of physiology.

In 1886 he was appointed a member of the Commission to report upon Pasteur's system of inoculation for hydrophobia, and in 1889 a member of the Nizam of Hyderabad's Chloroform Commission. For the latter a considerable amount of experimental work was carried out and a valuable report issued, though no very definite conclusions as to the action of chloroform were arrived at. In the meantime, Brunton had become one of the best-known consulting physicians in the country, and in the art of treatment he was most resourceful. He introduced a new class of remedies, the vaso-dilators, into medicine, and by the use of amyl nitrite for angina pectoris was the first to employ a remedy because its physiological action was opposed to the pathological condition existing in this disease, viz. rise of blood-pressure.

In 1900 he was knighted, and nine years later was given a baronetcy, and he was the recipient of many honours from universities and societies at home and abroad. He was also Gulstonian and Croonian lecturer and Harveian orator of the Royal College of Physicians of London. Several works emanated from his pen, notably the "Introduction to Modern Therapeutics," illustrating the connection between the chemical structure and physiological action of drugs, "Disorders of Assimilation," and "Therapeutics of the Circulation."

Sir Lauder Brunton, outside his professional work, was keenly interested in all schemes in favour of national health, of school hygiene, of physical culture and military training, in the furtherance of which he gave bountifully of his time and energies.

NOTES.

GEOLOGISTS will regret to hear of the death of Mr. R. J. L. Guppy at his home in the island of Trinidad on August 5, and within a few days of celebrating his eightieth birthday, Mr. Guppy having been born in London on August 15, 1836. In early life he qualified as a civil engineer, and afterwards travelled through Australia, Tasmania, and New Zealand. On joining his family in Trinidad in 1859, he took part in the construction of the Cipero Railway, but later becoming interested in the educational work of the colony, he was appointed Chief Inspector of Schools. Mr. Guppy, however, will be better remembered for his researches on the geology of Trinidad and the other West Indian islands. On this subject he contributed upwards of fifty papers, several of which were published by the Geological Society of London. He accumulated a great knowledge of the Tertiary faunas of that region, and did much towards rendering a correlation of the various horizons represented. His earlier memoirs dealt with the San Fernando deposits of Trinidad containing Orbitoidal and other fossils, which at first he regarded as of older Miocene age, but which afterwards he more correctly assigned to the younger Eocene or Lower Oligocene. He was always an ardent student of natural history, being particularly interested in the recent and fossil mollusca, and was also an authority on the rich deposits of petroleum which have made Trinidad so famous. Some years ago he was instrumental in acquiring for the British Museum the second largest known Pleurotomaria, possessing a height of 150 millimetres, which was discovered off the island of Tobago. Mr. Guppy was a corresponding member of the Zoological Society of London, and of the New York and Philadelphia Academies of Science. He had served as president of the Scientific Association of Trinidad, and was the first presiding officer of the Royal Victoria Institute Board. Much work yet remains to be accomplished among the Tertiary rocks of Trinidad, as many of the geological horizons are still in confusion and imperfectly understood; but whatever is attempted in the future, there is no doubt that Mr. Guppy's valuable memoirs will always furnish us with an important basis for later investigations on so interesting a subject.

MR. E. G. KENSIT, who fell in action at Delville Wood on July 17, was a great-nephew of the late Dr. Harry Bolus, and became a member of the staff of the Bolus Herbarium in the Botanical Department of the South African College in 1912. In August, 1915, he enlisted in the South African contingent for service overseas. After a period of training at Potchefstroom, he was sent to Egypt, and served through the Senussi campaign. The circumstances of the death are described in the following extract from the *Cape Times* of August 30:—"On the colonel of his regiment calling for a volunteer for the purpose of reconnoitring the enemy's line and securing certain information, Kensit was among those who stepped forward, and his offer was accepted. He was seen to be hit as he crawled away, but he continued with his task, and after an interval crept slowly back, hampered by his wound. On reaching the parapet he was assisted to surmount it. He was able to give the officer all the information that was wanted, but he had no sooner done so than he rolled over—dead."

WE regret to learn that Mr. Gustav Mann died at Munich on June 22, in his eighty-first year. To him we owe our knowledge of the botany of the Cameroon Mountain, for he was the pioneer of botanical exploration in this region when he was attached to Dr. Baikie's Niger Expedition in 1859 as botanical collector for Kew. He ascended Clarence Peak, in Fernando Po, and made extensive collections of plants from the mountains of western tropical Africa, which have been described in papers presented to the Linnean Society. He then went out to India, and after serving for a year as assistant in the Government cinchona plantations was transferred in 1864 to the Bengal Forestry Department. From 1868 he served in Assam, and in 1882 was appointed Conservator of Forests, which position he held with distinction until his retirement in 1891.

WE learn from the *British Medical Journal* that Lieut.-Col. G. M. J. Giles, Bengal Medical Service (retired), died at Plymouth on August 24, aged sixty-two. In his early service he spent some years as surgeon naturalist in the Indian survey ship, the Royal Indian Marine steamer *Investigator*, and in 1886–87 accompanied the late General Sir William Lockhart on an exploring expedition in the Pamirs. He was the author of works on kala-azar and beri-beri, mosquitoes, climate and health in hot countries, and tropical climatology.

A FEDERATION of British Industries has been formed to provide a body capable of representing the interests of the British manufacturing and producing industries. The objects of the federation may be summed up briefly as the organisation and development of industry now and after the war, in co-operation with labour and in conjunction with the Government and Government departments. The federation will at once concern itself with the reconstruction of British trade after the war; the development of sources of supply of raw materials; and questions arising out of the transition from war to peace, such as measures to mitigate possible unemployment during that period. Every effort is to be made to ensure that in future no important action affecting British industry shall be taken by the Government without due weight being given to the views of manufacturers. A condition of membership is an annual subscription of 100*l*. a year, with an obligation to continue such subscription until June 30, 1919. Mr. F. Dudley Docker, C.B., is the president of the federation.

THE recently issued report (Cd. 8346) of the Committee on Financial Facilities for Trade to the President of the Board of Trade recommends the establishment of a British Trade Bank, constituted under Royal Charter, to fill the gap between the home banks and the Colonial and British-foreign banking houses, and to develop facilities not provided by the present system. It is proposed that the bank should have a capital of 10,000,000*l*., and should, among other activities, inaugurate an information bureau, co-operate with merchant and manufacturer, and become a centre for syndicate operations. The bureau, it is suggested, should be independent of the Commercial Intelligence Branch of the Board of Trade, and would not necessarily deal only with schemes in which the bank proposed to take financial interests, but might be made a centre for the investigation of other projects. The report urges that if financial assistance is given by the Government to undertakings in connection with what are known as "key" industries, the business should be done through the new bank. The committee thinks that such a bank would, with efficient management, not only be a great boon to British trade, but also should prove a commercial success.

AN important addition to the art collections of the Philadelphia Museum is reported in the Museum Journal for last March. Mrs. Dillwyn Parrish, of London, has presented five Roman mosaics in memory of her late husband. Of these, the two most interesting specimens from the point of view of size come from Carthage; the other three, smaller, but charming, examples, are said to have been obtained in Rome. The Carthage mosaics are examples of *opus vermiculatum*—cubes of marble or other material disposed so as to attain to a pictorial effect. One of the Italian pieces, representing a duck, has much in common with some of the mosaics found in the House of the Faun in Pompeii. Another, considerably later in date, represents two griffins facing an urn, and is an example of the stiff, conventional, unimaginative work of the second century A.D. On the other hand, the lack of imagination is in some degree made up by the great technical skill shown in the treatment of the griffins, the colour being obtained by the use of cubes of opaque glass applied to the wings and tongues of the beasts.

THE deficiencies of modern India in the matters of house building and sanitation are a cause almost of despair to the authorities. No problem is so difficult as that of sanitation, because the official runs the constant risk of offending some religious or social prejudice. But it is not because their own writers have neglected the subject that the present condition of things has arisen. In the June issue of the Journal of the Bihar and Orissa Research Society Dr. Mahamahopadhyaya Ganga Nath Jha has collected the ancient Sanskrit laws on the subject. They deal with the sanitation of houses, and provide minute directions on the right uses of food and drink. Much of this is, no doubt, academic, and the rules on these subjects are the speculations of philosophers which in many cases could not have been brought into actual practice. But many of them are judicious, and may help the officer of health in preaching the value of sanitation. The pandit ends by saying:—"From the above it will be seen that the old people of this country knew and practised many laws of health and sanitation which have been forgotten, with results that all deplore."

THE *Indian Journal of Medical Research* for July (vol. iv., No. 1) contains several important papers. Dr. Soparkar describes a method for cultivating the tubercle bacillus from sputum after destruction of adventitious micro-organisms by treatment with caustic soda. Dr. Agnes Scott writes on osteomalachia, and Major McCarrison, I.M.S., describes the successful experimental production of congenital goitre in goats by feeding them with cultures of micro-organisms grown from the fæces of goitrous individuals (goats). He concludes, therefore, that congenital goitre is due to the action on the fœtal thyroid of toxic substances derived from the maternal intestine.

ON July 29, 1915, the Government passed the Milk and Dairies (Consolidation) Act, 1915, which consolidated in one Act the 1914 Bill and previous Acts of Parliament. The Act, however, does not come into force until such date as the Local Government Board may by Order appoint. As the Bill was passed by mutual consent of all sections of both Houses, it cannot be expected to include far-reaching improvements in the milk supply. It does, however, provide that the Local Government Board may issue "Orders," upon which the success of the Act will almost entirely depend. With the view of defining what may be considered the requirements necessary to improve the milk supply, representatives of the National Clean Milk Society, the Society of Medical Officers of Health, and the Sanitary Inspectors' Association have formulated a series of recommendations which have been forwarded to the President of the Local Government Board, and a copy of which we have received. These recommendations have been conceived in a moderate spirit, and their adoption would do much to improve the general milk supply. They do not, however, include a clause prohibiting the addition of skimmed milk to milk, a matter of some importance.

BEFORE the war the United States imported annually from Germany as much as 300,000 tons of potash. The failure of this source of supply has induced the Department of Agriculture to make the experiment of extracting potash from kelp. It is believed that the vast beds of this weed off the coast of California will suffice to furnish all the future needs of the country, and large quantities are already being placed on the market from this source. But, according to *California Fish and Game* for July, fears have been expressed that the cutting of the kelp will have an injurious effect upon the fisheries of the State, and this because of the protection afforded by the weed to the beaches, and the danger of exterminating the clams and spiny lobsters which live more or less within the protection of the kelp. They also fear that the young fish, especially barracuda, which are in the habit of seeking refuge here, will be driven away, and further that such fish as spawn here will similarly be destroyed. These several objections have now, however, been carefully examined, and it is pointed out that the kelp-cutters, or reapers, do not cut below 6 ft., thus leaving ample shelter. It may be, indeed, that the cutting will prove actually beneficial, since it will be less easily torn up by storms. The species of kelp which is thus being harvested is *Macrocystis pyrifera,* a plant which ranges in length from 100 to 300 ft.

IN the *Journ. Agric. Research* (vi., No. 14) Mr. V. L. Wildermuth describes the life-history of a lacewing fly (*Chrysopa californica*). The larvæ of Chrysopa are well known as beneficial insects on account of their habit of feeding on "greenfly" (aphids). *C. californica* lives as a larva for about sixteen days, during which it undergoes two moults, and eats from 74 to 160 full-grown aphids, besides a still larger number of young ones.

AN excellent twenty-page pamphlet by the Rev. Jas. Waterston on "Fleas as a Menace to Man and Domestic Animals" forms No. 3 of the British Museum's Economic Series. The structure and life-history of the insects are described in sufficient detail, and readers are warned of the great danger to be feared from those species which act as carriers of the plague-bacillus between rats and human beings. There are many instructive and illuminating statements, such as an observation quoted from Prof. Osborn, who once collected a teaspoonful of fleas' eggs from the dress of a lady who had been fondling a kitten!

IN the *Entomologists' Monthly Magazine* for August Mr. E. Meyrick publishes a "Note on Some Fossil Insects," dealing particularly with a hindwing, of Upper Triassic age, from Queensland, which has been named *Dunstania pulchra* and referred to the Lepidoptera by Mr. R. J. Tillyard. Mr. Meyrick points out that the nervuration of this hindwing would indicate a highly specialised Lepidopteran type, if the insect to which it belongs were really a moth. As the wing further possesses a corneous margin "altogether abnormal, no other Lepidoptera showing a trace of it," he is inclined, though with some hesitation, to suggest that it must be referred to a Homopterous insect. Incidentally he supports the Lepidopteran nature of Butler's *Palaeontina oolitica*, emphasising its affinity to the family of the "swift-moths" (Hepialidæ).

THE annual report of the Dove Marine Laboratory for 1916 contains an important paper by Prof. A. Meek on the method of estimating the age of fishes by inspection of the annual growth-rings on the scales. This method was extended by Lea, Dahl, and Hjort some years ago in this way: Assuming that the growth-rates of the scale and body of the fish (the herring) are strictly proportional, it ought to be possible to determine the age of the same individual in successive years by measuring the distances between the focal point of the scale and the margins of each of the rings. But application of this method led to some apparently anomalous results, and Lea's conclusions were criticised by Miss Rosa Lee, of the English Board of Agriculture and Fisheries. It appeared as if there was a contraction of growth of scale relative to the growth of the body, and the Norwegian investigators sought to explain this by postulating elimination of the fish exhibiting the more rapidly growing scales. In the publication now noticed Prof. Meek shows that there is not exact correlation between growth of body and of scale; the latter grows at first less rapidly than, then at the same rate as, and finally more rapidly than does the body. Curves of growth are probably exponentials and show this imperfect proportionality. Selection does indeed take place; there is a tendency (in the case of the herring) for fish of the same phase of sexual maturity to shoal together, so that those which are (sexually) younger tend to join with shoals of their own phase, and *vice versâ*. In the same publication Mr. B. Storrow applies the principle to the growth-rate of other fishes.

PROF. E. W. SINNOTT contributes to the *American Naturalist* (l., No. 596) an essay on the "Comparative Rapidity of Evolution in Various Plant Types." He concludes that the most recently evolved members of the North Temperate flora are herbaceous in habit, that herbs tend to be grouped in fewer and larger genera and families than shrubs and trees, and that herbs, with their rapid multiplication of generations, must be "in most cases undergoing evolutionary development much more rapidly than are trees and shrubs." The most ancient Angiosperms were probably woody, and "herbaceous vegetation has made its appearance in comparatively recent geological time."

IN his history of Ethiopian earthquakes (*Boll. Soc. Sismol. Ital.*, vol. xix., pp. 293–350) Prof. L. Palazzo has added to our knowledge of the seismic regions of Africa. His catalogue, which closes with the year 1912, contains 142 entries, all but seven since the beginning of the nineteenth century. He shows that the seismicity of Erythræa is higher than was supposed, and that the earthquakes sometimes attain a destructive intensity, while those which occur near the coast are occasionally accompanied by sea-waves. As to their origin, some are purely volcanic, but the majority he classes under Mercalli's heading of perimetric or intervolcanic.

DR. A. CAVASINO has recently published a valuable memoir on the after-shocks of the Italian earthquake of January 13, 1915 (*Boll. Soc. Sismol. Ital.*, vol. xix., 1915, pp. 219–91). These were recorded at the geodynamic observatory of Rocca di Papa, which is about forty miles from the epicentral area. The earthquake occurred at 7.53 a.m., and, owing to the strength of the shock, all the seismographs in the observatory were suddenly thrown out of action. Within three-quarters of an hour the more sensitive instruments were repaired, including the Agamennone microseismometrograph, the records of which are here considered. The loss of the earlier records of after-shocks is of little consequence, for, at Rome, the seismogram of the principal earthquake obliterated those of the after-shocks, and, moreover, the ground during the first hour was in such a state of continual agitation that individual shocks could not be distinguished. The number of after-shocks registered during the first twenty hours was 302, and during the first six months 1280. Dr. Cavasino considers that the distribution in time of these after-shocks does not follow Omori's well-known law deduced from the after-shocks of the great Japanese earthquakes.

THE Geologists' Association (Proc., vol. xxvii., 1916, p. 1) publishes a beautifully illustrated paper by Prof. Garwood on "The Faunal Succession of the Lower Carboniferous Rocks of Westmorland and North Lancashire," which serves, with its maps, as a guide to a very attractive district, including the high moors of Shap and the picturesque fault-blocks of the Arnside shore. In the same volume (p. 79) Mr. P. G. H. Boswell describes the constitution of the North Sea drift as found across eastern England. His mechanical analyses usefully distinguish this drift from the later Glacial brick-earths; but why does he use such expressions as ¼ and 1/100 of a millimetre? The remarkable variety and beauty of the mineral fragments in this mixed material are pointed out by one who clearly loves his subject.

THE "Rainfall of India" for 1914, which is the twenty-fourth year of issue, is collected from the returns published by the various Provincial Governments, and is issued in one volume by the Meteorological Department of the Government of India under the superintendence of Dr. G. C. Simpson, officiating Director-General of Observatories. The volume gives the monthly and annual rainfall, as well as the average rainfall for about 3000 stations in India, from the records taken daily at 8 a.m. The number of rainy days is given, and although the rainfall is measured to hundredths of an inch, a "rainy day" is taken as that on which a tenth of an inch or upwards has fallen, and the normal number of rainy days given in some cases is also calculated on the same assumption. The value of a "rainy day" being ten times as great in India as in England is regrettable, and some adjustment may be found possible when a change is made to meet the registration by the new units of measurement now generally adopted in this country and elsewhere. The normals used for the comparison are those revised to 1910 for the whole of India, and are mostly for at least thirty or forty years.

THE Bureau of Standards of the Department of Commerce of Washington issues a Scientific Paper, No. 286, on "The Determination of Aluminium as Oxide." The author, Mr. William Blum, finds that, to avoid loss of alumina, a hot 2 per cent. solution of ammonium chloride should be used for washing the precipitate, as this facilitates coagulation. Methyl red is used as an indicator of the optimum condition of alkalinity, since it shows a sharp colour change at the desired point. The quantitative reasons for its selection are interestingly stated. The elimination of other substances from the precipitate is considered. A copy of the paper will be sent free on application to the Bureau of Standards.

THE new American journal, *Aviation and Aeronautical Engineering*, contains much of interest, and should prove a successful enterprise, both in the States and elsewhere. The second number is specially worthy of note on account of the scientific nature of the contents. There is an excellent article on "Aviation and Aerography," in which the importance of meteorological research as a help to aviation is strongly emphasised. A short note entitled "An English Photograph of Great Interest" shows a very keen appreciation of the merits of the Royal Aircraft Factory machines, and of their inherent stability. An article on "Steel Construction of Aeroplanes" contains an account of a method of construction which must eventually supersede wood for the larger machines. Perhaps the most interesting item from a scientific point of view is the second part of "A Course in Aerodynamics and Aeroplane Design," written from the Massachusetts Institute of Technology. The authors treat of the elements of aerodynamical theory, and if future articles of the series are as clearly written as that in the present number, they should prove of considerable value to those who need an introduction to the subject.

FROM the reports of the behaviour of the recording instruments at a number of magnetic observatories in different parts of the world during the solar eclipse of August 21, 1914, Dr. Bauer and Mr. Fisk, of the Department of Terrestrial Magnetism, Washington, have drawn some preliminary conclusions as to the effects of eclipses on solar terrestrial magnetism, which will be found in the June number of *Terrestrial Magnetism and Atmospheric Electricity*. At stations from which the eclipse was visible it appears to have changed slightly the daily march of the declination needle. At four British and Danish stations for which curves of the daily change of declination are given the normal motion of the needle to the west was arrested, and in some cases reversed, a short time before totality of the eclipse. Outside the region of visibility of the eclipse no magnetic effects were observed. These results appear to justify more extensive preparations for observing the effects of the solar eclipse due June 8, 1918.

MESSRS. KODAK, LIMITED, have issued a new and much improved edition of their "Wratten Light Filters" (1*s*.), in which they describe some ninety colour screens. Of those previously catalogued eleven are omitted and twenty-nine new filters are introduced, the latter including a series of nine made to equalise the tints of various artificial lights for facilitating photometric work. The transmissions of nearly all the filters are given in very clearly expressed curves, a vast improvement on the reproductions of spectrographs taken with a graduating wedge in front of the slit, as given in the previous editions. For those who need more exact data the actual readings obtained by the use of the spectrophotometer are given in copious tables, and will prove of great value. "The Photography of Coloured Objects," another of Messrs. Kodak's publications, has been revised, and now includes "Orthochromatic Filters," which was until now published separately. For the benefit of any who do not know this volume, we may say that it gives a clear and accurate account of the principles involved, and points out objects of many kinds that are really "coloured," though they do not appear to be.

OUR ASTRONOMICAL COLUMN.

ENCKE'S COMET.—Prof. Strömgren reports that Encke's comet was observed by Dr. Max Wolf on September 22. At 9h. 41·5m., Königstuhl mean time, its position was R.A. 22h. 28m. 39s., declination 7° 8′ 5″ S. The magnitude of the comet was 16·5.

THE NEBULA H II. 78 LEONIS.—It is interesting to note that Mrs. Isaac Roberts is continuing her detailed studies of nebulæ photographed at Crowborough by the late Dr. Isaac Roberts. The subject of a recent paper (Monthly Notices R.A.S., vol. lxxvi., p. 647) is the nebula H II. 78 Leonis (N.G.C. 3367), photographed in 1902. The nebula extends for about 2′ from north to south, and 2·5′ in the direction at right angles, and is described as a left-hand spiral with a bright stellar nucleus. The nucleus is encircled twice by the spiral arm, which shows numerous condensations. With the aid of the Roberts "pantograver," measures were made of many of the bright nebulous knots, and of nineteen stars which appear in the neighbourhood of the nebula. All the measured objects are clearly indicated in a key chart, and the tabulated data will doubtless be of considerable value in subsequent investigations of relative motions within the nebula.

PHOTOGRAPHS OF MARS.—In the September number of the *Observatory* an account of a minute examination of photographs of Mars taken at Flagstaff by Dr. Lowell and his co-workers is given by G. H. Hamilton. The photographs were studied without reference to maps of the planet, and details common to three or more of the images, of which there were sometimes as many as four dozen on a single plate, were inserted in sketches. Subsequent comparisons in all cases showed a very close agreement with the accepted maps in the observatory. One of the sketches, from photographs taken on March 15 of the present year, is reproduced, and shows an abundance of detail, including numerous canals. Mr. Hamilton is of opinion that the linear character of the canals, as represented by Dr. Lowell, is completely confirmed by the photographs. By the use of a finely divided transparent scale, it was found possible to obtain satisfactory measurements of the positions of the principal markings, due allowance being made for halation.

SPECTRUM OF THE NEBULA H IV. 39 ARGÛS.—An account of the spectrum of H IV. 39 Argûs (N.G.C. 2438) has been given by Dr. Max Wolf (*Sitz. Heidelberg Akad. d. Wiss.*, March, 1916). The spectrum was photographed at the Königstuhl Observatory, Heidelberg, on February 20, with an exposure of five hours. The nebula is very faint, and direct photographs show it to be of annular form with an eccentrically situated stellar nucleus; the eastern side of the ring is the brighter, and the nucleus lies nearer the western edge. The spectrum is almost identical with that of the ring nebula in Lyra, but much fainter. In order of brightness the lines are λ 373, 387, 434 ($H\gamma$), 469, 501, and 397; there is possibly also a faint line at 352. As in the Lyra nebula, a distribution of the different gases in layers is indicated by the varying distances to which the lines extend. The line 373 reaches furthest outwards, but has a marked minimum in the interior of the ring. The lines 387 and 434 reach further towards the centre; and, in striking contrast with the other lines, 469 (*i.e.* 4686, of "proto-helium") is brightest within the ring, and extends only a small distance from the nucleus.

THE UNITED STATES NATIONAL RESEARCH COUNCIL.

AN account of the inauguration and organisation of the National Research Council of the United States was published in our issue of August 3 last (vol. xcvii., p. 465), and the article pointed out that from the cordial interest shown by all who had learnt of the work in its early stages, it was evident that so soon as a widespread request for co-operation could be extended it would meet with general acceptance. A preliminary report of the Organising Committee to the president of the U.S. National Academy of Sciences, published in the August issue of its Proceedings, shows that this expectation has been justified, and some of the first instances of co-operation are given. Prof. G. E. Hale, chairman of the committee, has also sent to the *New York Times* an account of what is being done in the United States to mobilise science for industrial progress and military efficiency, and we reprint his letter below. It will be seen that the president of the Throop College of Technology in Pasadena, California, an institution which gives special attention to research, hearing of the plans of the Research Council, offered the assistance and co-operation of the recently endowed research laboratory of chemistry, and secured at once an additional endowment of 20,000*l*. for scientific research. In somewhat similar circumstances a gift of 100,000*l*.